

*CERATOCOLAX MYKTERNASTES*, NEW SPECIES  
(COPEPODA, BOMOLOCHIDAE) PARASITIC IN  
THE NASAL SINUS OF *HAEMULON SCIURUS*  
(PISCES, POMADASYIDAE) FROM BELIZE

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*Abstract.*—*Ceratocolax mykternastes*, n. sp., is described from the nasal sinus of *Haemulon sciurus* from off Belize. Descriptions of both the female and male are given. The males differ in one respect from the generic diagnosis of *Ceratocolax*. Placement in the genus *Ceratocolax* is based primarily on female structures.

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During fieldwork in Belize in March 1980, I discovered a new species of *Ceratocolax* Vervoort in the nasal sinuses of the bluestriped grunt, *Haemulon sciurus* (Shaw). The only other species of *Ceratocolax* known thus far is *C. euthynni* Vervoort, parasitic in the nasal sinuses of the scombrid fishes *Euthynnus alleteratus* and *Sarda sarda* (Vervoort, 1965; Cressey and Cressey, 1980).

The illustrations were made with the aid of a Wild Drawing Tube. All measurements are of the holotype or allotype. All material is in the collections of the Smithsonian Institution.

*Ceratocolax mykternastes*, new species

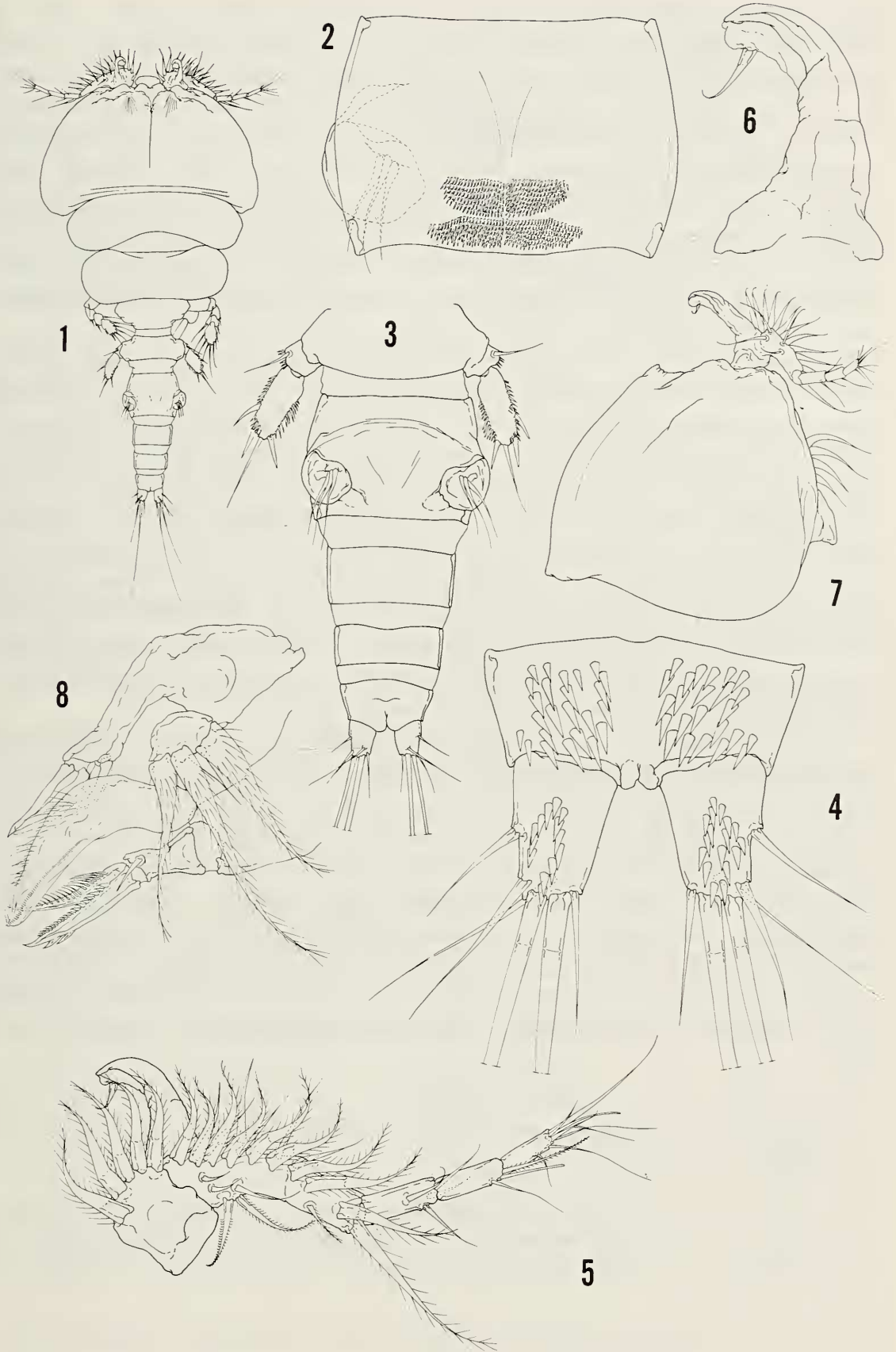
*Material examined.*—Holotype ♀ (USNM 181890), allotype ♂ (USNM 181891), and 11 ♀, 3 ♂ paratypes (USNM 181892) collected from the nasal sinuses of 24 *Haemulon sciurus* from off Carrie Bow Cay, Belize, 4-9 March 1980. In addition, one female and one male were dissected and illustrated and 2 females were prepared for examination with a scanning electron microscope; these additional specimens were from the same collection as the type-material.

*Female.*—Body form as in Figure 1. Total length 1.94 mm, greatest width 1.16 mm (measured at widest part of cephalon), length of cephalon 0.58

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Figs. 1-8. *Ceratocolax mykternastes*, female: 1, Dorsal; 2, Genital segment, ventral; 3, Genital segment and abdomen, dorsal; 4, Last abdominal segment and caudal rami, ventral; 5, First antenna; 6, First antenna spine; 7, Cephalon and first antenna, lateral; 8, Mandible, paragnath, first maxilla, second maxilla.



mm; cephalon with median, longitudinal groove. Genital segment (Fig. 2) wider than long ( $265 \times 324 \mu\text{m}$ ), ventrally with prominent patches of spinules as indicated in figure; spinules may appear as one patch, or there may be more or less distinct areas between patches; in all specimens examined, however, outline of spinulose area was similar. Abdomen (Fig. 3) 3-segmented, segments measure (l  $\times$  w)  $123 \times 188 \mu\text{m}$ ,  $118 \times 165 \mu\text{m}$ , and  $106 \times 153 \mu\text{m}$  respectively; last segment (Fig. 4) ventrally with 2 prominent patches of large spinules. Caudal rami (Fig. 4) slightly longer than wide ( $70 \times 53 \mu\text{m}$ ); each ramus with 6 setae, 2 much longer than other 4, and ventral patch of spinules similar to those on last abdominal segment; longest seta measures  $613 \mu\text{m}$ .

First antenna (Fig. 5) 5-segmented (second segment incompletely divided), first and second segments together bearing row of 15 stout, plumose setae, last 2 segments each with one aesthete. Arising dorsally near juncture of first and second segments is a long, curved, sclerotized spine bearing a small, naked seta; seta is embedded in membrane reaching from tip of spine to midlength of edge; tip of spine curves mediad toward crenulate cephalic knob (Figs. 6, 7, 27). Rostrum with 2 ventral hooks (Fig. 28). Second antenna similar to that of *C. euthynni*, with numerous rows of small, closely spaced hooklets, 4 hooked spines, and 2 apical setae. Mandible, paragnath, first maxilla and second maxilla as in Figure 8; labrum with 2 large patches of stout spinules. Maxilliped (Fig. 9) with one naked and 3 plumose setae; maxilliped hook with outer accessory tooth.

Legs 1–4 biramous, rami 3-segmented except leg 1 exopod. Legs 2–4 all segments, except leg 2 endopod third segment, with patches or rows of stout spinules along outer or distal edges, as indicated in figures. Leg 1 (Fig. 10) coxopod distolateral corner heavily haired, distal edge with short row of spinules; basipod with long, stout, plumose seta on distolateral corner, ventral surface with large patch of spinules near insertion of endopod, and smaller rows and patches of spinules as indicated in figure; exopod 2-segmented, second segment incompletely divided, first segment with outer crenulate spine, second segment with 4 outer spines and 6 terminal to inner setae; endopod 3-segmented, first and second segments each with one inner

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Figs. 9–14. *Ceratocolax mykternastes*, female: 9, Maxilliped; 10, Leg 1; 11, Leg 2; 12, Leg 3; 13, Leg 4; 14, Leg 5.

Figs. 15–22. *Ceratocolax mykternastes*, male: 15, Dorsal; 16, Genital segment and abdomen, ventral; 17, Last abdominal segment and caudal rami, ventral; 18, First antenna; 19, Second antenna; 20, Mandible, paragnath, first maxilla, second maxilla; 21, Maxilliped; 22, Leg 1.

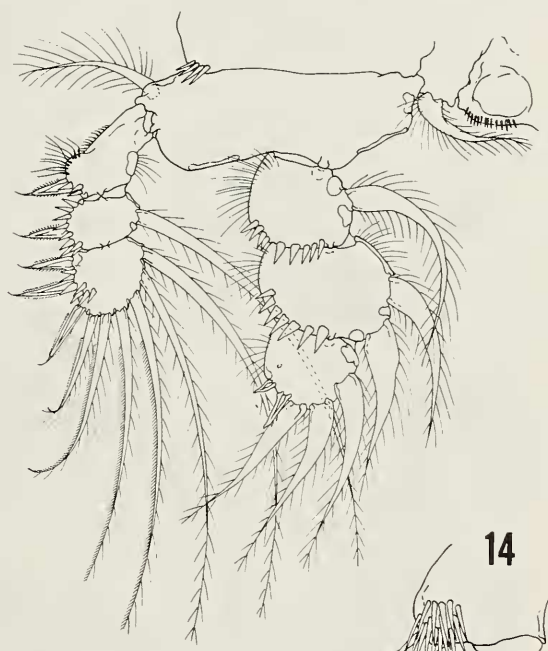
Figs. 23–26. *Ceratocolax mykternastes*, male: 23, Leg 2; 24, Leg 3; 25, Leg 4; 26, Leg 5.



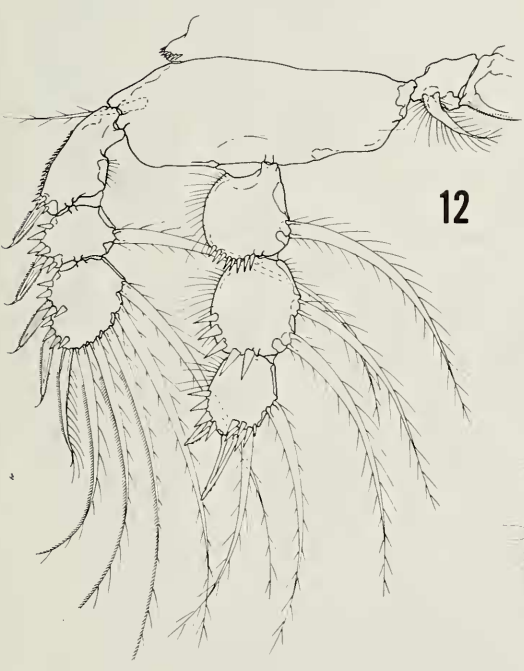
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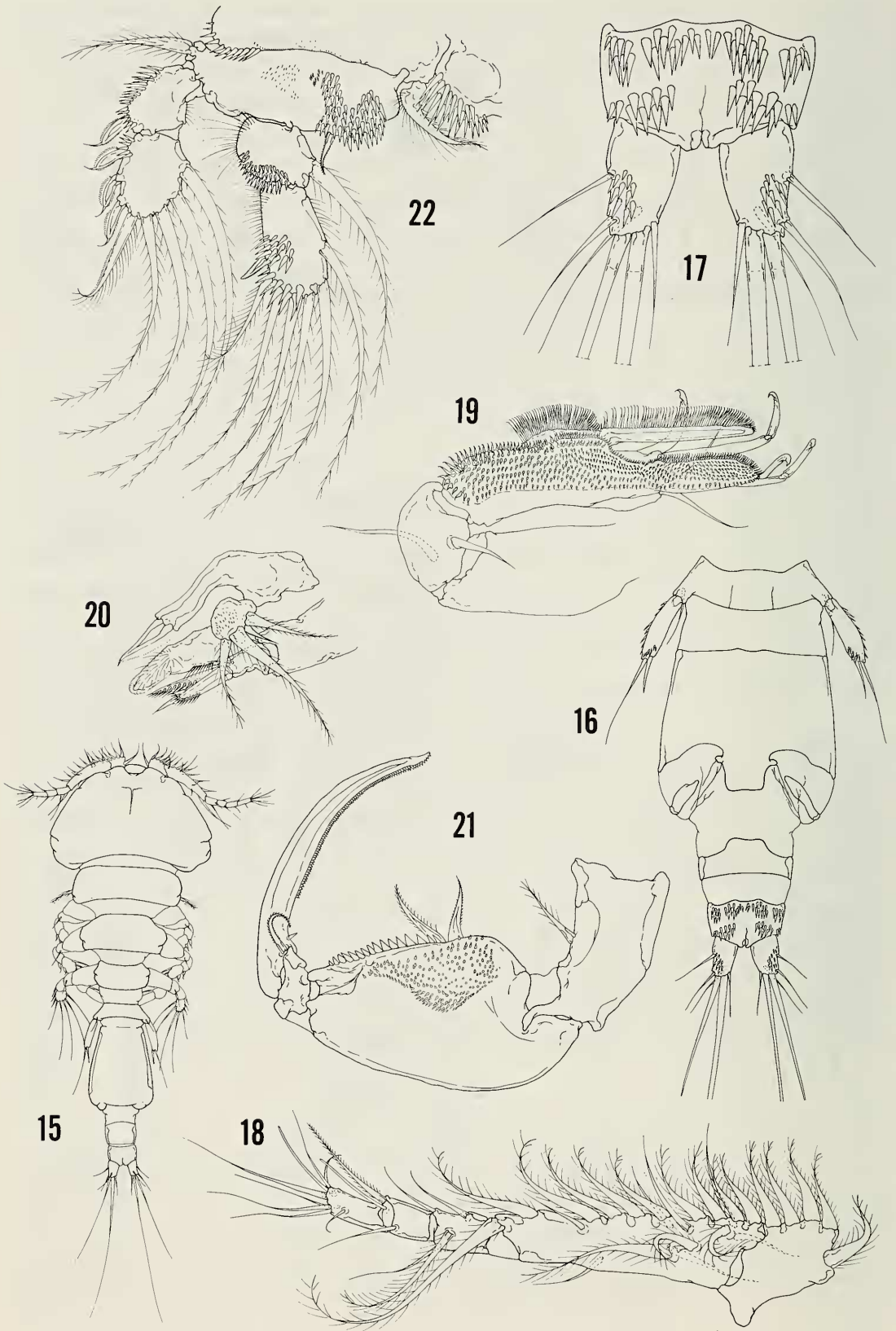


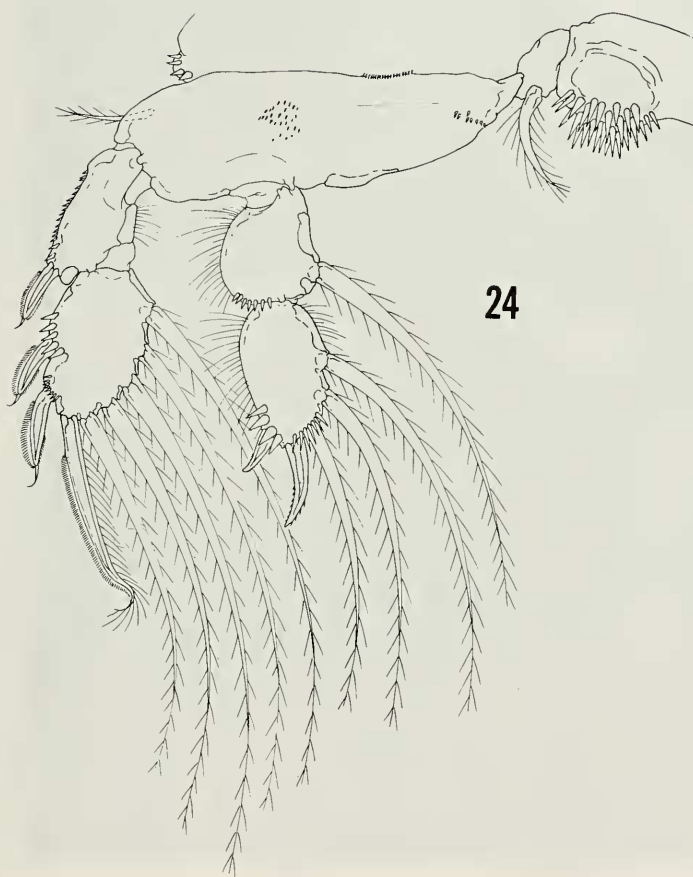
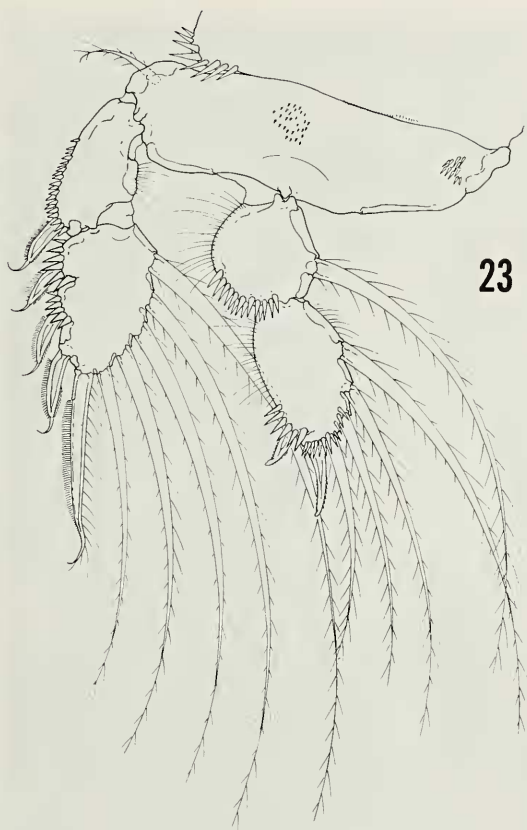
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seta and row of short hairs along distolateral edge; third segment with one small spine on outer corner, and 5 setae (all setae plumose); interpodal plate (Fig. 29) with flattened, overlapping spinules. Leg 2 (Fig. 11) coxopod with short row of spinules on distolateral corner; basipod with slender, plumose seta on distolateral corner; exopod first segment with outer spine, outer and inner edge of segment haired, second segment with outer spine and inner seta, third segment with 3 outer spines and 6 setae, 4 outermost setae with long plumes on inner edge, short hairs on outer edge (see Fig. 30), all spines with short hairs along margins and flagellum at tip (see Fig. 31); endopod somewhat inflated, first segment with stout, inner seta, second segment with 2 inner setae, third segment with 3 inner to terminal setae and 2 outer, sclerotized spines. Leg 3 (Fig. 12) similar to leg 2 with following exceptions: exopod first segment outer edge spinulose, third segment with 2 outer spines and 6 setae; endopod not inflated, last segment with 2 setae and 2 spines, spines larger than those on leg 2. Leg 4 (Fig. 13) exopod similar to leg 3 except more slender and patches of spinules larger; endopod elongate (especially third segment), extending well beyond exopod; first and second segments each with short, inner seta, proximal half of each seta plumose, distal half spinulose, third segment with distal seta flanked by 2 spinulose spines. Leg 5 (Fig. 14) uniramous, first segment with outer plumose seta and outer patch of long, slender spinules; free segment with 3 long, slender, spinulose spines and one naked seta, segment with several patches of long, slender spinules. Leg 6 represented by 3 naked setae on genital segment near area of egg sac attachment (Figs. 2, 3).

*Male*.—Body form as in Figure 15. Total length 1.25 mm, greatest width 0.50 mm, length of cephalon 0.32 mm. Genital segment (Fig. 16) slightly longer than wide ( $230 \times 206 \mu\text{m}$ ). Abdomen 2-segmented, segments measure ( $l \times w$ )  $88 \times 94 \mu\text{m}$ , and  $64 \times 88 \mu\text{m}$  respectively; last segment (Fig. 17) ventrally with several patches of stout spinules. Caudal rami (Fig. 17) longer than wide ( $47 \times 29 \mu\text{m}$ ), each ramus with 6 setae (2 much longer than other 4), and ventral patch of stout spinules; longest seta  $460 \mu\text{m}$ .

First antenna (Fig. 18) 5-segmented with anterior row of 15 stout, plumose setae on first and second segments; last 2 segments each with one aesthete; no spines or modified setae. Rostral hooks absent. Second antenna (Fig. 19) similar to that of female, but rows of spinules not so closely spaced. Mandible, paragnath, first and second maxillae as in Figure 20. Mouthparts very small, and accessory mandibular blade, present in female, could not be seen in male specimen dissected and illustrated; first maxilla with minute spinules

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Figs. 27–32. *Ceratocolax mykternastes*, female: 27, First antenna spines, lateral,  $\times 750$ ; 28, Ventral rostral hooks,  $\times 1050$ ; 29, Leg 1 interpodal plate,  $\times 775$ ; 30, Leg 2 exopod seta,  $\times 1600$ ; 31, Leg 2 exopod spine,  $\times 1500$ ; 32, Leg 3 exopod, tip of last segment,  $\times 1000$ .



or hairs on basal segment; paragnath with short row of slender spinules along distal edge. Maxilliped (Fig. 21) basal segment with one plumose seta; second segment with patch of short spinules, 2 plumose setae, and row of stout, triangular spinules; last segment clawlike, with plumose seta and smaller, naked setule, inner edge with row of small, toothlike spinules.

Legs 1–4 biramous, rami 2-segmented; all segments with patches or rows of stout spinules along outer or distal edges as indicated in figures. Leg 1 (Fig. 22) coxopod with row of stout spinules along distolateral edge, and plumose seta on distomedial corner; basipod with long, outer plumose seta, a somewhat horseshoe-shaped patch of spinules on inner surface and short, spinulose seta medial to insertion of endopod; exopod first segment with outer spine; second segment with 4 outer spines, and 4 inner to terminal plumose setae; proximal 4 spines haired on margins, with flagellum at tip; distal spine elongate, tapered and sickle-shaped at tip, inner edge plumose, outer edge with short, closely spaced hairs; endopod first segment with inner seta, second segment somewhat elongate, with short, outer spine and 6 inner to terminal plumose setae, outer margins of endopod segments heavily haired; interpodal plate with long, stout spinules. Leg 2 (Fig. 23) coxopod with row of spinules on outer distal corner; basipod with outer seta smaller than that on leg 1, small patch of spinules on inner surface; exopod similar to leg 1 except second segment with 2 rows of spinules on outer edge, and 5 plumose setae; also, distal spine more elongate than that of leg 1; endopod first segment with inner seta, second segment with 2 outer to terminal spines and 4 inner to terminal plumose setae. Leg 3 (Fig. 24) similar to leg 2 with following exceptions: exopod second segment with only 2 short, flagellated, outer spines; endopod second segment with only 3 plumose setae. Leg 4 (Fig. 25) exopod similar to leg 3 except proximal 3 outer spines slightly more elongate and serrate rather than haired on margins, second segment with only 4 plumose setae; endopod first segment with inner seta, second segment elongate with terminal spinulose seta flanked by 2 elongate spinulose spines. Leg 5 (Fig. 26) uniramous, basal segment with sparsely plumose seta, free segment with stout spinules along outer and distal margins, distally with stout inner spine and outer seta.

*Etymology*.—The specific name is from the Greek, *mykter* (nostril), and *nastes* (dweller), referring to the habitat of this parasite.

*Remarks*.—The females of *C. mykternastes* agree with Vervoort's (1965) generic diagnosis of *Ceratocolax*, especially in the unusual structure of the first antenna. *Ceratocolax mykternastes* can be distinguished from *C. euthynni* by a number of features: *C. mykternastes* has a prominent spinulose area on the ventral surface of the genital segment, this is lacking in *C. euthynni*, the adults of which have prominent lateral processes on the genital segment; the dorsal antennal spine of *C. mykternastes* has an accessory seta near the tip, this seta is not present on *C. euthynni*; leg 2 endopod first

and second segments of *C. mykternastes* have stout spines along the distal edges, rather than tufts of hairs as in *C. euthynni*; *C. mykternastes* leg 4 exopod last segment has 2 spines, 6 setae, while *C. euthynni* has 3 spines, 4 setae. In addition, there are several other, minor points of difference between the two species.

Male *C. mykternastes* differ from Vervoort's generic diagnosis of *Ceratocolax* in one respect; that is, the number of segments of legs 1–4. The rami of legs 1–4 of *C. euthynni* are 3-segmented (except leg 4 endopod 2-segmented); those of *C. mykternastes* are all 2-segmented. A comparison of the spine and seta formulae of these two species shows that both species have the same total number of spines on leg 1 endopod and on both rami of legs 2–4. The total number of setae has been reduced by 1 in *C. mykternastes* on both rami of legs 2 and 3, and leg 4 exopod; the total number of spines and setae is the same for both species for legs 1 and 4 endopods. In all other respects, males of the present species agree with the generic diagnosis of *Ceratocolax*.

In spite of this apparently major difference between the males, I have placed this species in *Ceratocolax* principally on the basis of the female morphology. Many copepod species (and genera) are known only from females, therefore, it would not seem wise, at this time, to erect a new genus on the basis of a male character alone. Collections of more members of this genus will perhaps lead to modifications of the generic diagnosis, or to the establishment of a new genus.

In addition to *H. sciurus*, two other species of *Haemulon* were caught and examined for copepods: 20 specimens of the French grunt, *H. flavolineatum* (Desmarest), and one specimen of the smallmouth grunt, *H. chryseum* Gunther; none of these specimens were found to have any copepod parasites.

In 1980, Cressey and Cressey misspelled *Ceratocolax* as “*Ceratacolax*” when redescribing *C. euthynni*, and throughout the manuscript; we regret this error.

#### Acknowledgments

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